

viewing angles. The applicants have found that the angled top surfaces of the film 8 refract the light into the desired viewing angles best when the angle between those flat surfaces is between 95 to 120 degrees. Further, improvements in the viewing light occur when the tops of the prisms are spaced at regular intervals not exceeding 160 μm to prevent visible interference fringes and are aligned with a polarizing axis of the polarizer to decrease light loss.

The claims are rejected over a combination of Kashima et al and Ooi et al patents, that combination alone or in view of one or both of an IBM publication and an Abileah patent. The Kashima patent discloses a light enhancing film of a back lighting device for which it is stated on lines 7 to 9 of column 3 that the "only requirement that has to be satisfied is that the exit face of the film should eventually be coarser grained than the entrance face." Figure 6 shows the exit face as made up of irregularly shaped forms which are referred to in the specification and claims as "asperities" indicating that the exit surface is rough or irregular, not a uniform pattern of pyramids or prisms. The fact that the exit face is irregular is confirmed in example 1 for the polycarbonate film given in lines 8 to 23 of column 6. On lines 18 to 21, it is stated that "the distance between adjacent concaves or convexes as measured in the direction of the exit face of the film was 10 to 800 μm ." Further, there is no regularity in the heights of the asperities, they vary in height from 10 to 100 μm .

The Kashima et al patent mentions three ranges of angles. The language in the Kashima et al patent is confusing. It is not clear what angle is being described as being within the specified ranges. The angle is claimed in claim 6 as being an "apical" angle being formed in connection with some vertical cut made through the apex of the projections when the cut is made to obtain a minimum apical angle. What is clear is that it is not

the angle made by the intersection of flat, angled surfaces. The exit face of the Kashima et al patent is described as being convex and concave and is presented as curved in Fig. 6. It is not made up of flat, angled surfaces like the sides of the prisms or pyramids. If the exiting face in Kashima was the flat, angled surfaces of a prism, the height h (10 to 100 μm) and spacing d (10 to 800 μm) of the projections in the Kashima et al patent indicate that the top angle ϕ (where the $\tan \phi/2 = h/d/2$) would vary from less than 11° when $h = 100$ and $d = 10$ to more than 276° when $h = 10$ and $d = 800$. This is much greater than any of the ranges specified in the Kashima et al patent. In applicants' invention, it is the relationship of the top angle of prisms to the flat, angled sides of the prisms that determines the gathering of the diffuse light off those sides to provide bright and uniform light across the viewing angle of crystal displays. The curved surfaces of Kashima et al do not have that relationship with the ranges of angles described by Kashima et al. It can be seen from a comparison of Fig. 4 of the Kashima et al patent and Figs. 6, 7 and 11 of the present application, that the apparatus of the present invention provides a more uniform distribution of light over the receiving angle.

The Ooi patent does show the use of prisms. However from the description of Fig. 5, the prisms are apparently for absorbing or trapping indirect light, particularly that hitting the viewing face of the LCD, as opposed to transmitting light from a back light. Secondly, the angles 1 and 2 are each between 65° and 90° where one of the angles is not 90° . This means the apex angle is between a maximum of 50° and a minimum of less than 1° , well outside the range of 95° and 120° called for in the present application.


For the above reasons, all claims in the application are distinguishable over the cited prior art. All the claims call for prismatically shaped elements with a top angle specified as

using between 95° and 120° to gather light into the desired viewing angle of the liquid crystal display device.

Claims 7, 11 and 14 further distinguish over the prior art in that they call for alignment of the prismatic shapes with an axis of the polarizer and the tops of the prisms are no farther than 1 to 0 μm apart. The projections in Kashima et al can be up to 1000 μm apart.

For the above reasons, it is respectfully submitted that all claims are allowable over the prior art and it is therefore requested that the application be reconsidered, all claims allowed and the application passed to issue. If the Examiner does not consider the claims allowable, it is requested that this amendment be entered for purposes of appeal. It reduces the number of claims on appeal and clarifies the issues to be considered.

RESPECTFULLY SUBMITTED,


A handwritten signature in cursive script, reading "James E. Murray", is written over a horizontal line.

James E. Murray - Attorney

Registration No.: 20,915

Telephone No.: (914) 462-4763

Fax No.: (914) 432-9601